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What is the Impact of the 2020 Coronavirus Lockdown on Maxillofacial Trauma?



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Purpose: The novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) or COVID-19 pandemic first arrived in Nashville, Tennessee, in early March 2020. Soon after, stay-at-home orders were initiated. The purpose of this study is to evaluate the impact of a 7-week lockdown on maxillofacial trauma volume at TriStar Skyline Medical Center, a level II trauma center in Nashville, Tennessee.

Patients and Methods: The investigator designed a retrospective cohort study and enrolled a sample of patients who presented for evaluation of maxillofacial trauma between March 23 and May 11 in the years 2019 and 2020. The primary predictor variable was evaluation of injuries during the 2020 lockdown period or the same control period in 2019. The primary outcome variable was injury volume. Additional variables including demographic information, etiology, anatomic location, and initial disposition were evaluated. Descriptive and bivariate statistics were computed, with statistical significance set at $P < .05$.

Results: The study sample showed a 35.6% reduction in patients seen during the 2020 lockdown ($n = 38$) compared with 2019 ($n = 59$, $P = .15$). The proportion of male to female trauma patients increased during the lockdown period from 6.6:1 ($n = 33$ male, $n = 5$ female) in 2020 compared with 2.3:1 ($n = 41$ male, $n = 18$ female) in 2019 ($P = .049$). The number of assaults decreased by 65.2% ($P = .22$). The percentage of patients seen on an outpatient basis decreased from 27.1% ($n = 16$) to 5.3% ($n = 2$, $P = .007$) during the lockdown period.

Conclusions: The initial 7-week lockdown during the COVID-19 pandemic was associated with a decrease in patients with maxillofacial trauma. The effect of the stay-at-home orders with resultant social distancing, has shown a decrease in maxillofacial trauma due to interpersonal violence.

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The first confirmed case of the novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) or COVID-19 was reported in Nashville, Tennessee, on March 8, 2020.¹ Over the following 2 weeks, multiple important events occurred. On March 11th, the World Health Organization declared COVID-19 a global pandemic.² Nashville Mayor, John Cooper, issued a statement on March 15th advising the population to take precautions to prevent person-to-person spread, including postponement of large public and private gatherings, encouragement of remote working and protecting all citizens especially the medically fragile

residents.³ Less than 24 hours later, Mayor Cooper forced bars to close in Nashville and Davidson county and imposed limitations on restaurants to carry out service only. On the same day, Governor Bill Lee asked the state's public schools to close by March 20th.⁴ The number of active cases increased to 46 cases by March 18th and a State of Emergency throughout Metropolitan Nashville and Davidson County was declared with a partnership announced between the government and area hospitals.⁵ On March 20th, the Metro Public Health Department announced a total number of 110 confirmed cases, an increase of 50 cases in

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the last 24 hours along with the first confirmed death of a 73-year-old man who died from complications from the coronavirus.⁶ As the number of confirmed cases continued to increase over the next 48 hours, the Mayor's office announced the "Safer at Home Order" effective on Monday, March 23. This order essentially closed all nonessential businesses and encouraged residents to stay home when possible and avoid groups of more than 10 people. The "Safer at Home Order" resulted in a regional lockdown in Middle Tennessee starting March 23, 2020, and was extended 4 times over the following 7 weeks. The lockdown ended on May 11, 2020, as Nashville entered phase 1 of reopening with 3,699 confirmed cases and 35 deaths due to coronavirus.^{7,8}

The purpose of this study was to understand the impact of the regional lockdown during the initial phases of the COVID-19 pandemic on the epidemiology of maxillofacial trauma. The author hypothesized that the number of maxillofacial injuries would decrease as the result of the regional lockdown. The author also hypothesized that the number of maxillofacial injuries caused by interpersonal violence would decrease as result of the "Safer at Home Order" and bar closure. The specific aims were to 1) measure and compare the frequency of maxillofacial injuries sustained by individuals who presented during a period of lockdown vs those without; 2) estimate and compare the anatomic location of maxillofacial injuries between the 2 groups; and 3) estimate and compare the etiology of maxillofacial injuries between the 2 groups.

Methods

STUDY DESIGN AND SAMPLE

To address the research purpose, the investigator designed and implemented a retrospective cohort study. The study sample was composed of patients who presented to TriStar Skyline Medical Center, in Nashville, Tennessee. The study population was composed of all patients presenting for evaluation and management of maxillofacial trauma during the 2020 lockdown period and the same period during 2019. The periods were selected to capture patients who presented when the lockdown was (comparison group) and was not in effect (control group). To be included in the study sample, patients must 1) have been managed during the period beginning March 23rd and ending May 11th in the years 2019 or 2020; 2) have had records adequate for data abstraction; 3) have data that are recorded in the Facial Trauma Database at TriStar Skyline Medical Center. Patients were excluded from the study if they 1) had inadequate medical records preventing data abstraction; 2) if they were not entered into the Facial Trauma

Database. This study was reviewed and received Institutional Review Board approval (HCA 2020-910).

STUDY VARIABLES

The primary predictor variable was the period which the subject presented for evaluation of their maxillofacial injury. The control group included those who presented between March 23, 2019, and May 11, 2019. The comparison group included those who presented during the period of the 2020 coronavirus lockdown beginning March 23, 2020, and ending May 11, 2020.

The primary outcome variable was injury volume. Demographic, anatomic, and dispositional variables were recorded for all patients. Demographic variables included age, gender, initial presentation (inpatient or outpatient), and etiology (assault, fall, vehicular, sport, or other blunt force). Anatomic variables were recorded as upper face, middle face, lower face, or multiple locations. Dispositional variables were recorded for admitted patients and included length of time spent in emergency department and initial admission location (floor, trauma intensive care unit, trauma progressive care unit, or operating room).

DATA COLLECTION AND ANALYSIS

Data collection was performed using 2 methods 1) abstraction of study variables from the institutional trauma registry, and 2) abstraction of study variables from the Facial Trauma Database. All data were deidentified and kept in a secure spreadsheet accessible only by the principle investigator. All statistical analysis was performed using SPSS, version 26 (IBM, Armonk, NY). Descriptive statistics were calculated for all study variables in each cohort. Bivariate analysis was performed to assess the association between the predictor and outcome variables with significance set at $P < .05$.

Results

During the study period, 836 trauma patients presented to TriStar Skyline Medical Center. The final study sample was composed of 97 patients with maxillofacial injuries who met the inclusion criteria. The number of patients in the 2020 cohort ($n = 38$) was 35.6% lower than the 2019 cohort ($n = 59$, $P = .15$).

Descriptive and analytic statistics are presented in Table 1. Most patients were men (86.8% in 2020 and 69.5% in 2019, $P = .049$). The average age of patients seen during the lockdown was 45.7 (15-82) compared with an average age of 42.7 (14-83) in 2019 ($P = .47$). The 2020 cohort showed a decreased proportion of injuries from assault (21.1% in 2020 vs 39% in 2019, $P = .22$) and an increase in injuries from falls (34.2% in 2020 vs 28.8% in 2019, $P = .22$). The anatomic region of injury was constant in both cohorts with

Table 1. SUMMARY OF STUDY VARIABLES WITH BIVARIATE ANALYSIS COMPARING MAXILLOFACIAL TRAUMA PRESENTING DURING LOCKDOWN IN 2020, RELATIVE TO THE SAME PERIOD IN 2019

Variable	2019 Cohort n (%)	2020 Cohort n (%)	P-Value
Total trauma patients	444	392	NA
Maxillofacial trauma patients	59 (13.3)	38 (9.7)	.15
Gender			.049*
Male	41 (69.5)	33 (86.8)	
Female	18 (30.5)	5 (13.2)	
Initial presentation			.007*
Inpatient	43 (72.9)	36 (94.7)	
Outpatient	16 (27.1)	2 (5.3)	
Age			
Average age (range)	42.7 (14-83)	45.7 (15-82)	.47
Average age (range) inpatient	43 (16-83)	44 (15-81)	.80
Average age (range) outpatient	41.75 (14-79)	75.5 (69-82)	.047*
Etiology			.22
Assault	23 (39)	8 (21.1)	
Falls	17 (28.8)	13 (34.2)	
Vehicular	14 (23.7)	10 (26.3)	
Sport or other blunt force	5 (8.5)	7 (18.4)	
Anatomic location			.94
Upper face	3 (5.1)	3 (7.9)	
Midfacial	32 (54.2)	19 (50)	
Lower face	20 (33.9)	13 (34.2)	
Multiple	4 (6.8)	3 (7.9)	
Minutes spent in ED (range)	320 (50-794)	192 (18-543)	<.001*
Admission location			<.001*
Floor	11 (25.6)	26 (72.2)	
TICU	10 (23.2)	6 (16.7)	
Trauma PCU	22 (51.2)	3 (8.3)	
Operating room	0 (0)	1 (2.8)	

Abbreviations: ED, emergency department; TICU, trauma intensive care unit; PCU, progressive care unit; NA, not applicable.

* Statistically significant ($P < .05$).

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midfacial injuries being the most prominent (50% in 2020 and 54.2% in 2019, $P = .94$) followed by lower facial injuries (34.2% in 2020 and 33.9% in 2019, $P = .94$).

The percentage of patients seen on an outpatient basis significantly decreased during the 2020 lockdown (5.3% in 2020 vs 27.1% in 2019, $P = .007$). For the patients admitted to the hospital, the average time the patient spent in the emergency department before final disposition into the hospital was 192 (18-543) minutes during the 2020 lockdown compared with 320 (50-794) minutes during 2019 ($P < .001$). Admission location in the 2020 cohort showed most patients were admitted to the floor (72%) compared with the trauma progressive care unit (51.2%) in 2019 ($P < .001$).

Discussion

The purpose of this study was to understand the impact of the regional lockdown during the initial

phases of the COVID-19 pandemic on the epidemiology of maxillofacial trauma presenting to a level II trauma center located in Nashville, Tennessee. The author hypothesized that the number of maxillofacial injuries would decrease along with the number of maxillofacial injuries caused by interpersonal violence as the result of the "Safer at Home Order." The specific aim of the study was to quantify and analyze the frequency of maxillofacial injuries sustained by individuals who presented during a period of lockdown (March 23-May 11, 2020) compared with the year prior (March 23-May 11, 2019).

The results of this study confirm the hypothesis that the 2020 COVID-19 lockdown resulted in an overall decrease in maxillofacial trauma and decrease in the number of patients presenting due to assault from interpersonal violence. After the start of the 2020 COVID-19 lockdown, a 35.6% decline in presentation of maxillofacial trauma was observed. This is a greater decrease than the 11.7% reduction in overall trauma

patients seen by the trauma center during the lockdown period. This general picture has been noted in other metropolitan areas where a 20% decrease in trauma volume has been noted during their own periods of lockdown in the initial phases of the pandemic.⁹ Other acute care specialties, such as orthopedic trauma, have noted similar decreases.¹⁰ However, these decreases are less than the overall 42% decrease noted in most emergency departments according to the Centers for Disease Control.¹¹

The number of recorded police incidents for assault decreased 11% during the lockdown period.¹² As a result, maxillofacial trauma related to interpersonal violence decreased 65.2% during the lockdown period. It is understood that not every assault with associated maxillofacial injuries is reported to the police, but one can speculate that this decrease is directly due to people staying at home and practicing social distancing if outside the home. During the lockdown period, all bars, in dining restaurants, live music establishments, and conventions in downtown Nashville were shut down, essentially resulting in the cessation of all tourism during a usually busy spring break travel time. Similarly, vehicular accidents in the region decreased 59% due to less people traveling as many businesses were closed or allowed their employees to work from home during the lockdown period.¹³

A decrease in the number of female patients presented during the lockdown period along with a change in the ratio of inpatient referral to outpatient referral of 2.7:1 in 2019 to 18:1 in 2020. The patients seen in an outpatient setting were both elderly males with midfacial fractures referred from outside facilities who wanted to avoid immediate transfer. The average time spent in the emergency department before admission decreased by 128 minutes during the lockdown period. This was directly due to the decrease in overall emergency department volume coupled with an overall decrease in hospital volume leading to increased capacity and improved throughput. Given the widespread uncertainty, public anxiety, and restrictions such as stay-at-home orders imposed during the initial phase of the pandemic, many patients with acute illness, whether life-threatening or not, did not seek care out of fear of contagion or concerns about access at COVID-19-overrun hospitals.¹⁴ Reconfiguration of hospital bed allocation and creation of COVID-19-specific units resulted in loss of trauma specific step-down beds, therefore resulting in a greater percentage of patients being admitted to general floor rooms in 2020 than previously. The anatomic location of injuries was very consistent when comparing 2019 to 2020. Injuries to the midface were the most common, followed by the lower face. These areas accounted for greater than 84% of all patients, while injuries to the upper face or multiple anatomic areas

were similar in number and comprised the remainder of cases.

The main limitation of this study was that it was a retrospective, single-institution study and may not be representative of a national profile. The 7-week lockdown period was analyzed using the same period 1 year prior to develop the control cohort as the direct periods before and after were filled with social and geopolitical unrest in the region. It is not known if periods of shorter or extended lockdowns would produce similar results and if the results of this study are consistent with other regions of the country. It is not uncommon for patients with maxillofacial trauma to have delayed presentation to the emergency department. These include acts of interpersonal violence or minor vehicular accidents that do not require emergency medical service activation. It may be reasonable to assume that some patients with minor injuries may have not sought evaluation and treatment on fear to present to the emergency department during the initial phases of the COVID-19 pandemic. This may account for the decrease in proportion of patients with maxillofacial injuries compared with the overall trauma volume seen during the lockdown compared with the previous year.

In conclusion, the COVID-19 pandemic and initial 7-week lockdown period from March 23, 2020, until May 11, 2020, resulted in an 35.6% decrease in maxillofacial trauma and 65.2% decrease in the number of patients presenting due to assault from interpersonal violence in Nashville, Tennessee. This is due to the stay-at-home order and practicing social distancing if outside the home. Future studies should compare these findings with other geographic regions and whether different periods of lockdown, social restrictions, or phased reopening have the same effect on interpersonal violence and overall trauma volume.

References

1. Timms M: Coronavirus in Tennessee: Timeline of cases, closures and changes as COVID-19 moves on; 2020. *Tennessean Newspaper*, Gannett, March 25
2. Cucinotta D, Vanelli M: WHO Declares COVID-19 a pandemic. *Acta Biomed* 91:157, 2020
3. Nashville COVID-19 response, Mayor's March 15th Statement, March 15, 2020. Available at: <https://www.asafenashville.org/updates/mayors-march-15th-statement/>. Accessed December 28, 2020
4. TN office of the governor, governor Bill Lee statement, March 17, 2020. Available at: <https://www.tn.gov/governor/covid-19/covid19timeline.html>. Accessed December 28, 2020
5. Nashville COVID-19 response, mayor John Cooper Declares state of emergency throughout metropolitan Nashville and Davidson county, March 18, 2020. Available at: <https://www.asafenashville.org/updates/mayor-john-cooper-declares-state-of-emergency-throughout-metropolitan-nashville-and-davidson-county/>. Accessed December 28, 2020
6. Nashville COVID-19 response, Daily Metro COVID-19 press Update, March 20, 2020. Available at: <https://www.asafenashville.org/updates/metro-public-health-department-officials-confirm-first-covid-19-death-of-nashville-resident/>. Accessed December 28, 2020

7. Nashville COVID-19 response, Daily Metro COVID-19 press Update, May 7, 2020. Available at: <https://www.asafenashville.org/updates/daily-metro-covid19-press-update-for-05-07-20/>. Accessed December 28, 2020
8. Nashville COVID-19 response, Daily Metro COVID-19 press Update, May 11, 2020. Available at: <https://www.asafenashville.org/updates/daily-metro-covid19-press-update-for-05-11-20/>. Accessed December 28, 2020
9. Qasim Z, Sjöholm LO, Volgraf J, et al: Trauma center activity and surge response during the early phase of the COVID-19 pandemic-the Philadelphia story. *J Trauma Acute Care Surg* 89: 821, 2020
10. Chang Park, Sugand Kapil, Nathwani Dinesh, et al: Impact of the COVID-19 pandemic on orthopedic trauma workload in a London level 1 trauma center: The "golden month" *Acta Orthopaedica* 91: 556, 2020
11. Hartnett KP, Kite-Powell A, DeVies J, et al: National syndromic Surveillance Program Community of Practice. Impact of the COVID-19 pandemic on emergency department Visits - United States, January 1, 2019-may 30, 2020. *MMWR Morb Mortal Wkly Rep* 69:699, 2020
12. Data.Nashville.gov, Metro Nashville police department incidents. Available at: <https://data.nashville.gov/Police/Metro-Nashville-Police-Department-Incidents/2u6v-ujjs//data>. Accessed December 28, 2020
13. Data.Nashville.gov, Metro Nashville police Traffic accidents. Available at: <https://data.nashville.gov/Police/Traffic-Accidents/6v6w-hpcw>. Accessed December 28, 2020
14. Birkmeyer JD, Barnato A, Birkmeyer N, et al: The impact of the COVID-19 pandemic on hospital admissions in the United States. *Health Aff (Millwood)* 39:2010-2017, 2020